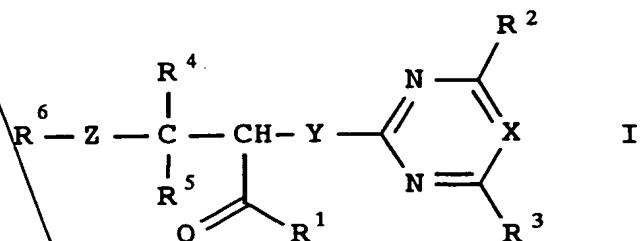


Arshad
We claim:-

1. A 3-(het)arylcetoxylic acid derivative of the formula I

5

10



where R is formyl, CO_2H or a radical hydrolyzable to COOH and
15

R^2 is halogen, $\text{C}_1\text{-C}_4$ -alkyl, $\text{C}_1\text{-C}_4$ -haloalkyl, $\text{C}_1\text{-C}_4$ -alkoxy,
 $\text{C}_1\text{-C}_4$ -haloalkoxy or $\text{C}_1\text{-C}_4$ -alkylthio;

20 X is nitrogen or CR^{14} , where R^{14} is hydrogen or, together
with R^3 , forms a 3-membered or 4-membered alkylene or
alkenylene chain, in each of which a methylene group is
replaced by oxygen;

25 R^3 is halogen, $\text{C}_1\text{-C}_4$ -alkyl, $\text{C}_1\text{-C}_4$ -haloalkyl, $\text{C}_1\text{-C}_4$ -alkoxy,
 $\text{C}_1\text{-C}_4$ -haloalkoxy or $\text{C}_1\text{-C}_4$ -alkylthio or R^3 is linked to R^{14}
as stated above to form a 5-membered or 6-membered ring;

30 R^4 is phenyl or naphthyl which may be substituted by one or
more, in particular one to three, of the following
radicals: halogen, nitro, cyano, hydroxyl, mercapto,
amino, $\text{C}_1\text{-C}_4$ -alkyl, $\text{C}_1\text{-C}_4$ -haloalkyl, $\text{C}_1\text{-C}_4$ -alkoxy,
 $\text{C}_1\text{-C}_4$ -haloalkoxy, $\text{C}_1\text{-C}_4$ -alkylthio, $\text{C}_1\text{-C}_4$ -alkylamino,
di- $\text{C}_1\text{-C}_4$ -alkylamino, $\text{C}_1\text{-C}_4$ -alkylcarbonyl or $\text{C}_1\text{-C}_4$ -alkoxy-
carbonyl;

35

35 a five-membered or six-membered heteroaromatic structure
which contains one to three nitrogen atoms and/or one
sulfur or oxygen atom and may carry one or more of the
following radicals: halogen, nitro, cyano, hydroxyl,
mercapto, amino, $\text{C}_1\text{-C}_4$ -alkyl, $\text{C}_1\text{-C}_4$ -haloalkyl,
 $\text{C}_1\text{-C}_4$ -alkoxy, $\text{C}_1\text{-C}_4$ -haloalkoxy, $\text{C}_1\text{-C}_4$ -alkylthio,
 $\text{C}_1\text{-C}_4$ -alkylamino, $\text{C}_1\text{-C}_4$ -dialkylamino, $\text{C}_1\text{-C}_4$ -alkylcarbonyl,
 $\text{C}_1\text{-C}_4$ -alkoxycarbonyl or phenyl;

45

37

R⁵ is hydrogen, C₁-C₄-alkyl, C₃-C₆-alkenyl, C₃-C₆-alkynyl, C₃-C₈-cycloalkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxyalkyl, C₁-C₄-alkylthioalkyl or phenyl;

5 R⁶ is C₁-C₈-alkyl, C₃-C₆-alkenyl, C₃-C₆-alkynyl or C₃-C₈-cycloalkyl, it being possible for these radicals to be mono- or polysubstituted in each case by: halogen, nitro, cyano, C₁-C₄-alkoxy, C₃-C₆-alkenyloxy, C₃-C₆-alkynyoxy, C₁-C₄-alkylthio, C₁-C₄-haloalkoxy, 10 C₁-C₄-alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkyl-amino, di-C₁-C₄-alkylamino, phenyl or phenyl or phenoxy which is mono- or polysubstituted, for example mono- to trisubstituted, by halogen, nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or 15 C₁-C₄-alkylthio;

Y is sulfur or oxygen or a single bond; and

Z is sulfur or oxygen;

20 with the proviso that R⁶ is not unsubstituted C₁-C₄-alkyl when R⁴ is unsubstituted phenyl, Z is oxygen and simultaneously R⁵ is methyl or hydrogen.

25 2. A 3-(het)arylcarboxylic acid derivative of the general formula I as claimed in claim 1, where R is



30 where R¹ has the following meanings:

35 a) hydrogen;

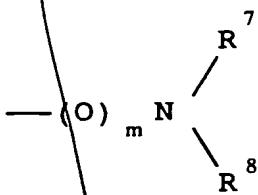
b) a succinylimidoxy group;

40 c) a 5-membered heteroaromatic structure which is bonded via a nitrogen atom, contains two or three nitrogen atoms and may carry one or two halogen atoms or one or two of the following radicals:

45 C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio;

d) a radical

5



10 where m is 0 or 1 and R⁷ and R⁸, which may be identical or different, have the following meanings:

hydrogen;

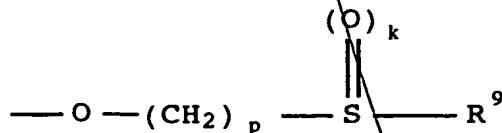
15 C₁-C₈-alkyl, C₃-C₆-alkenyl, C₃-C₆-alkynyl or C₃-C₈-cyclo-alkyl, where each of these radicals may carry one to five halogen atoms or one or two of the following groups:
 C₁-C₄-alkoxy, C₃-C₆-alkenylloxy, C₃-C₆-alkynylloxy,
 C₁-C₄-alkylthio, C₃-C₆-alkenylthio, C₃-C₆-alkynylthio,
 C₁-C₄-haloalkoxy, C₁-C₄-alkylcarbonyl, C₃-C₆-alkenyl-
 20 carbonyl, C₃-C₆-alkynylcarbonyl, C₁-C₄-alkoxycarbonyl,
 C₃-C₆-alkenylloxy carbonyl, C₃-C₆-alkynylloxy carbonyl,
 di-C₁-C₄-alkylamine, C₃-C₈-cycloalkyl, phenyl or phenyl
 which is monosubstituted or polysubstituted by halogen,
 nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy,
 25 C₁-C₄-haloalkoxy or C₁-C₄-alkylthio;

30 phenyl which may be substituted by one or more of the following radicals: halogen, nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio;

35 R⁷ and R⁸ together form a cyclic, optionally substituted C₄-C₇-alkylene chain or together form a cyclic, optionally substituted C₃-C₆-alkylene chain containing a hetero-atom selected from the group consisting of oxygen, sulfur and nitrogen;

e) R¹ is furthermore a group

40



45 where R⁹ is C₁-C₄-alkyl, phenyl or phenyl which is mono-
 substituted or polysubstituted by halogen, nitro, cyano,
 C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-halo-

alkoxy or C_1 - C_4 -alkylthio, or C_1 - C_4 -haloalkyl,
 C_3 - C_6 -alkenyl or C_3 - C_6 -alkynyl, p may be 1, 2, 3 or 4 and
k may be 0, 1 or 2.

5 f) a radical OR^{10} , where R^{10} is:

i) hydrogen, an alkali metal cation, one equivalent of
an alkaline earth metal cation, the ammonium cation
or an organic ammonium ion;

10 ii) C_3 - C_8 -cycloalkyl which may carry one to three
 C_1 - C_4 -alkyl radicals;

15 iii) C_1 - C_8 -alkyl which may carry one to five halogen atoms
or one of the following radicals:

20 C_1 - C_4 -alkoxy, C_1 - C_4 -alkylthio, cyano, C_1 - C_4 -alkyl-
carbonyl, C_3 - C_8 -cycloalkyl, C_1 - C_4 -alkoxycarbonyl,
phenyl, phenoxy or phenylcarbonyl, where the aromatic
radicals in turn may each carry one to five halogen
atoms or one to three of the following radicals:
nitro, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl,
 C_1 - C_4 -alkoxy, C_1 - C_4 -halo alkoxy [sic] or C_1 - C_4 -alkyl-
thio;

25 iv) C_1 - C_8 -alkyl which may carry one to five halogen atoms
and carries one of the following radicals: a 5-mem-
bered heteroaromatic structure containing one to
three nitrogen atoms or a 5-membered heteroaromatic
30 structure containing one nitrogen atom and one oxygen
or sulfur atom, which may carry one to four halogen
atoms or one or two of the following radicals: nitro,
cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -alkoxy,
 C_1 - C_4 -haloalkoxy or C_1 - C_4 -alkylthio;

35 v) C_2 - C_6 -alkyl which carries one of the following
radicals in the 2 position: C_1 - C_4 -alkoxyimino,
 C_3 - C_6 -alkenyloxyimino, C_3 - C_6 -haloalkenyloxyimino or
benzyloxyimino;

40 vi) C_3 - C_6 -alkenyl or C_3 - C_6 -alkynyl, where these groups in
turn may carry one to five halogen atoms;

45

vii) phenyl which may carry one to five halogen atoms or one to three of the following radicals: nitro, cyano, C_1-C_4 -alkyl, C_1-C_4 -haloalkyl, C_1-C_4 -alkoxy, C_1-C_4 -haloalkoxy or C_1-C_4 -alkylthio;

5

viii) a 5-membered heteroaromatic structure which has bonded via a nitrogen atom, contains one to three nitrogen atoms and may carry one or two halogen atoms or one or two of the following radicals: nitro, cyano, C_1-C_4 -alkyl, C_1-C_4 -haloalkyl, C_1-C_4 -alkoxy, C_1-C_4 -haloalkoxy or C_1-C_4 -alkylthio;

10

15

ix) R^{10} is furthermore a group $\text{---N}=\text{C}\begin{cases} \text{R}^{11} \\ \text{R}^{12} \end{cases}$ where

R^{11} and R^{12} , may be identical or different and are each:

20

C_1-C_8 -alkyl, C_3-C_6 -alkenyl, C_3-C_6 -alkynyl or C_3-C_8 -cycloalkyl, where these radicals may carry one C_1-C_4 -alkoxy or C_1-C_4 -alkylthio or one phenyl radical;

25

phenyl which may be substituted by one or more of the following radicals:

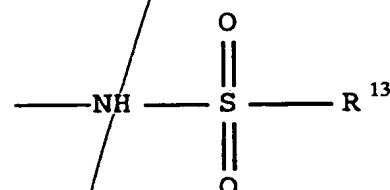
halogen, nitro, cyano, C_1-C_4 -alkyl, C_1-C_4 -haloalkyl, C_1-C_4 -alkoxy, C_1-C_4 -haloalkoxy or C_1-C_4 -alkylthio;

30

or R^{11} and R^{12} together form a C_3-C_{12} -alkylene chain which may carry one to three C_1-C_4 -alkyl groups;

g) or R^1 forms a radical

35



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where R^{13} is:

45

C_1-C_4 -alkyl, C_3-C_6 -alkenyl, C_3-C_6 -alkynyl or C_3-C_8 -cycloalkyl, where these radicals may carry one C_1-C_4 -alkoxy or C_1-C_4 -alkylthio or one phenyl radical;

phenyl which may be substituted by one to five halogen atoms or one to three of the following radicals: nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio.

5 3. A 3-arylcarboxylic acid derivative of the formula I as claimed in claim 1, in which R⁴ is phenyl which may be substituted as stated in claim 1 and the remaining substituents have the meanings stated in claim 1.

10 4. A 3-arylcarboxylic acid derivative of the formula I as claimed in claim 1, in which Z is oxygen, R⁴ is phenyl which may be substituted as stated in claim 1, R⁵ is methyl, X is CH, R² and R³ are each methoxy and Y, R¹ and R⁶ have the meanings stated in claim 1.

15 5. A 3-hetarylcarboxylic acid derivative of the formula I as claimed in claim 1, in which R⁴ is a five- or six-membered heteroaromatic structure as claimed in claim 1 and the remaining substituents have the meanings stated in claim 1.

20 6. A 3-hetarylcarboxylic acid derivative of the formula I as claimed in claim 1, in which Z is oxygen, R⁴ is a five- or six-membered heteroaromatic structure as claimed in claim 1, R⁵ is methyl, X is CH, R² and R³ are methoxy and Y, R¹ and R⁶ have the meanings stated in claim 1.

25 7. A herbicide containing a compound of the formula I as claimed in claim 1 and conventional inert additives.

30 8. A method for controlling undesirable plant growth, wherein a herbicidal amount of a compound of the formula I as claimed in claim 1 is allowed to act on the plants or on their habitat.

35 9. An agent for influencing plant growth, containing a compound of the formula I as claimed in claim 1 and conventional inert additives.

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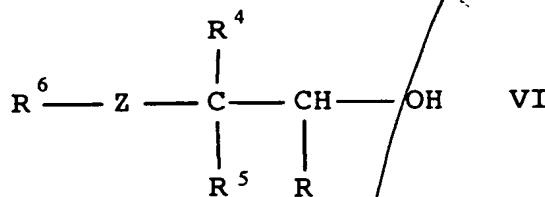
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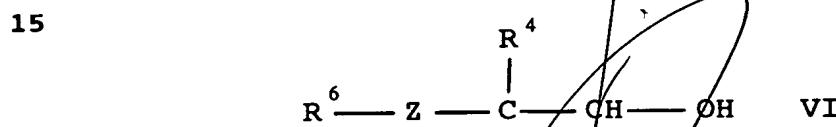
40 10. A method for regulating plant growth, wherein a bioregulatory amount of a compound of the formula I as claimed in claim 1 is allowed to act on the plants or on their habitat.

45 11. A 3-(het)arylcarboxylic acid derivative of the formula VI

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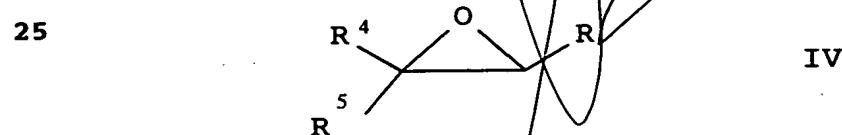
where R , R^4 , R^5 , R^6 and Z have the meanings stated in claim 1, with the proviso that R^6 is not unsubstituted alkyl when R^4 is unsubstituted phenyl or 4-isobutylphenyl, Z is oxygen and R^5 is simultaneously methyl or hydrogen.

12. A process for the preparation of a 3-(het)arylcarboxylic acid derivative of the formula VI



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wherein an epoxide of the formula IV



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where R , R^4 and R^5 have the meanings stated in claim 1, is reacted with a compound of the formula V

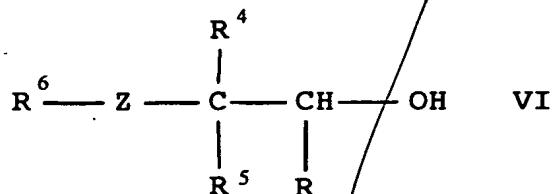


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where R^6 and Z have the meanings stated in claim 1, with the proviso that R^6 is not unsubstituted alkyl when R^4 is unsubstituted phenyl or 4-isobutylphenyl, Z is oxygen and R^5 is simultaneously methyl or hydrogen, if required in an inert solvent or with the addition of a suitable catalyst.

45

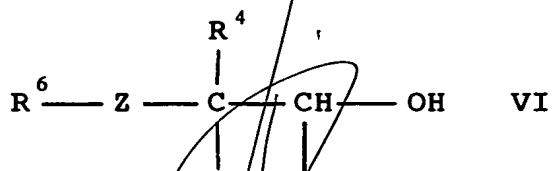
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where R , R^4 , R^5 , R^6 and Z have the meanings stated in claim 1.

10 12. A process for the preparation of a 3-(het)arylcarboxylic acid derivative of the formula VI

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wherein an epoxide of the formula IV

25



30

where R , R^4 and R^5 have the meanings stated in claim 1, is reacted with a compound of the formula V



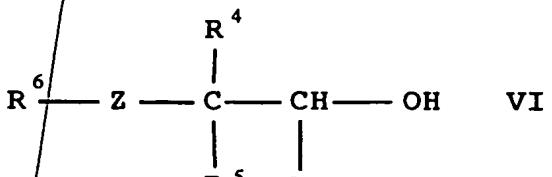
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where R^6 and Z have the meanings stated in claim 1, if required in an inert solvent or with the addition of a suitable catalyst.

40

13. A process for the preparation of 3-(het)arylcarboxylic acid derivatives of the formula I as claimed in claim 1, where Y is oxygen wherein the 3-het(aryl)carboxylic acid derivative of the formula VI

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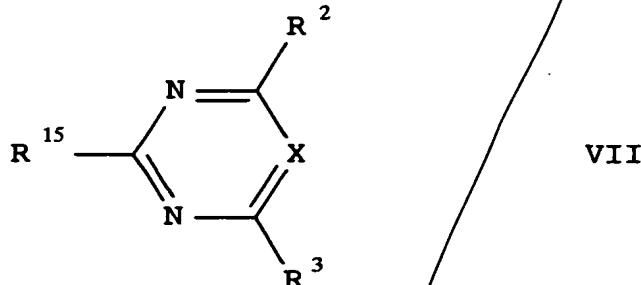


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where the substituents have the meanings stated in claim 1,
is reacted with a pyrimidyl or triazinyl derivative of the
formula VII

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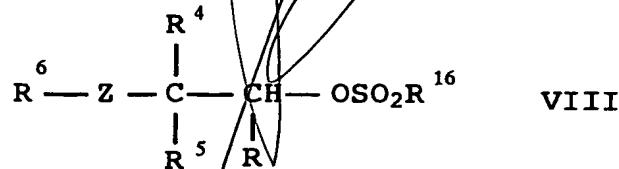
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where R^{15} is halogen or $R^{16}SO_2^-$ and R^{16} is C_1-C_4 -alkyl,
 C_1-C_4 -haloalkyl or phenyl, in an inert solvent in the presence
of a base.

20

14. A process for the preparation of a 3-het(aryl)carboxylic acid
derivative of the formula I as claimed in claim 1, where Y is
sulfur, wherein a 3-het(aryl)carboxylic acid derivative of
the formula VIII

25

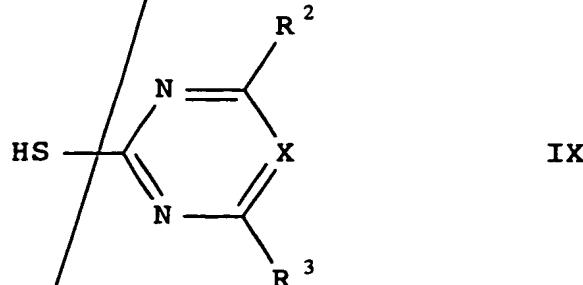


30

R_1, R_4, R_5, R_6 and Z
where the substituents have the meanings stated in claim 12,
is reacted with a pyrimidyl- or triazinylthiol of the formula
IX

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where R^2 , R^3 and X have the meanings stated in claim 1.

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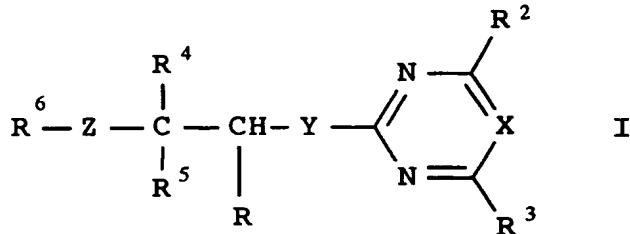
3-(Het)arylcarboxylic acid derivatives, their preparation and intermediates for their preparation

5 Abstract

3-(Het)arylcarboxylic acid derivatives of the formula I

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where R is formyl, CO₂H or a radical hydrolyzable to COOH and the other substituents have the following meanings:

20 R² and R³ are each halogen, alkyl, haloalkyl, alkoxy, haloalkoxy or alkylthio;

25 X is nitrogen or CR¹⁴, where R¹⁴ is hydrogen or, together with R³, forms an alkylene or alkenylene chain, in each of which a methylene group is replaced by oxygen;

30 R⁴ is phenyl or naphthyl, each of which is unsubstituted or substituted or an unsubstituted or substituted five-membered or six-membered heteroaromatic structure containing one to three nitrogen atoms or one sulfur or oxygen atom;

35 R⁵ is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, haloalkyl, alkoxyalkyl, alkylthioalkyl or phenyl;

40 R⁶ is C₁-C₈-alkyl, C₃-C₆-alkenyl, C₃-C₆-alkynyl or C₃-C₈-cyclo-alkyl, each of which may be mono- or polysubstituted;

45 Y is sulfur, oxygen or a single bond; and

40 Z is sulfur or oxygen;

with the proviso that R⁶ is not unsubstituted C₁-C₄-alkyl when R⁴ is unsubstituted phenyl, Z is oxygen and simultaneously R⁵ is methyl or hydrogen.